# WA-Trans Steering Committee Meeting

**October 17, 2007**

**9:00 A.M. to 12:00 P.M.**

**Washington State Department of Transportation**

**NW Region Headquarters**

**15700 Dayton Ave. N., Room 3B**

**Seattle, WA 98133-5910**

Agenda:

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| I. | Introductions, Status Questions, Time Tracking, Action Item Review |
| II. | Presentation and Report on Pend Oreille County |
| III. | Review Default Data User Formats and Requirements |
| IV. | Requirements for WA-Trans Change Control Procedures Regarding Data Providers |
| V. | Process for Data User Portal Requirements Regarding Output Adjustments When There Are No Agreement Points |
| VI. | Accelerated Statewide Implementation Issue |
| VII. | Close, Next Meeting |

Attendees:

| Member | Association | Representing |
|---|---|---|
| Michelle Blake | WSDOT GIS Data Steward | WA-Trans Project |
| Dave Cullom | WA. Utilities & Transportation Commission | Rail And Utility Needs |
| Shawna Ernst | Spokane County GIS | GIS Technician |
| Dave Rideout | Spokane County Engineers Office | East side local government |
| Ian Von Essen | Spokane County GIS | E-911 |
| Holly Glaser | WSDOT Geographic Services | WA-Trans (GIS Analyst) |
| David Goldish | Seattle | WA-Trans (Tech Writer / Contractor) |
| Tami Griffin | WSDOT Geographic Services | WA-Trans (Project Manager), Facilitator |
| Allyson Jason | U.S. Geological Survey | The National Map |

| Michael Leierer | WSDOT Geographic Services | WA-Trans (Assistant Project Manager/ Technical Lead) |
| Mac McKay | Seattle | Dept. of Natural Resources (DNR) |
| Andy Norton | Puget Sound Regional Council | MPO and RTPO |
| Pat Whittaker | WSDOT Transportation Data Office | WSDOT Transportation Data Office |

Not Attending:

| Member | Association | Representing |
|---|---|---|
| Tareq Al-Zeer | WSDOT NW Region Maintenance Engineer | WSDOT |
| Chuck Buzzard | Pierce County GIS | Local Govt. GIS |
| Kristina Evanoff | Sound Transit | Transit Needs |
| Michael Fallon | Bureau of Land Management | Bureau of Land Management |
| Michaellyn Garcia | Census Bureau | US Bureau of Census |
| Kathy O'Shea | Country Road Administration Board | County Road Administration Board |
| Lurleen Smith | Mason County Public Works | West Side Local Government |
| Elizabeth Stratton | WSDOT | Freight Interests |
| Tim Young | WA Dept. of Fish and Wildlife | WA Dept. of Fish and Wildlife |

Facilitator:  Tami Griffin          Notes Taker:  Tami Griffin / David Goldish

# I. Introductions, Status Questions, Time Tracking, Action Item Review

The following outstanding action items are based on issues that were brought up at the 7/19/2007 meeting.  Today's meeting and status report focused primarily on items in process.  For a complete list of action items, previous status reports, and other WA-Trans material, go to:

*http://www.wsdot.wa.gov/mapsdata/TransFramework/steering.htm*

## Review of Action Items:

- Work with Project Staff to:  1) Determine when Pend Oreille County can submit data, and 2) Develop a translator.

- Inform WA-Trans project about segmentation over overpasses, etc. and providing input about segmentation schemes and options. (This will probably be discussed at the next meeting.)

- Tami is leading a group from WSDOT to determine what must be included of the WSDOT GPS dual carriage way centerline  to meet their needs.  We're still working with DOT as part of the Puget Sound Pilot.  Right now we're looking at the Pierce County-King County data that's in WA-Trans.  We're looking at the DOT-GPS centerline data to see how we can combine the two sets.

- Jason Nielson is replacing Cathy Udenberg at Walla Walla County Public Works.

| Action Items |
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| ✎  Tami will include segmentation discussion at the next meeting agenda. |

# I. Presentation and Report on Pend Oreille County, WA

A slide presentation was given by Ian Von Essen and Shawna Ernst.  Ian spoke about the project background and issues with existing data.  This was followed by Shawna's presentation on the topic, "Integrating Distinct Transportation Data into a Single Geo-database Framework."

For complete details of the presentation, copy and paste the link below in your browser:

http://www.wsdot.wa.gov/mapsdata/transframework/project_presentations/WASHDOT%20Integrating%20Distinct%20Transportation%20Data%20into%20a%20Single%20Geodatabase.pdf

Ian cited 3 main reasons for Spokane County's involvement with Pend Oreille and neighboring counties to improve their GIS data, roads, and the whole parcel of data sets:

1. We received a grant from USGS for a National Map server. Part of that grant was to collect regional data and help spearhead that effort.

2. All fire districts within Spokane County have mutual update agreements with neighboring counties' fire districts. FEMA and the Department of Homeland Security need better data for Region 9 and are demanding more data.

3. We're a regional center for the Cop Link program. The neighboring counties are also partners in that program.

## Pend Oreille County Presentation

ROAD PROJECT TIMELINE

The Pend Oreille County project got started in January, 2006 after being asked to help support Eastern Washington University in regard to a grant they submitted to USGS. The grant was awarded the following March. In June, 2006 the project team did a survey of their GIS data and sent it out to all their regional partners. They acquired and presented that data in September. In Pend Oreille County, two main data source departments were maintaining the road data independently – 911 and Engineering. They were using MapInfo software, mainly for map creation rather than database functionality.

The database was adopted and modified from a WA-Trans geo-database model for Pend Oreille County.

- Washington State DNR Orthophotography was acquired in September, 2006. A modified WA-Trans geo-database model was adopted for Pend Oreille County roads. We began conflation and spatial correction of Pend Oreille County roads data.

- The National Agriculture Imagery Program (NAIP) Orthophotography was acquired in September 2007.

- A new grant was received from the Washington State Department of Community, Trade and Economic Development (CTED) for boundaries.

- In October 2007 all roads were spatially corrected to orthophotography and integrated into a single geo-database framework.

ORGANIZATIONAL STRUCTURE

The main groups involved in this project are:

- Pend Oreille Board of County Commissioners
- NSDI CAP Project Leader
- Steering Committee
- County User Group

- Spokane County GIS
- Staff / Consultant Support

INTEGRATING DISTINCT TRANSPORTATION DATA INTO A SINGLE GEO-DATABASE FRAMEWORK

## Data Sources

The county offices are currently in the process of switching to the new ARC GIS dataset. The 911 Dept. and Engineering Road Dept. were the main two data sources.

| Data Sources | Usage |
|---|---|
| 911 Roads | Addressing and geocoding |
| Engineering Roads | County road numbers and mile posting |
| Seattle City Light | Check spatial accuracy of project work |
| Washington DNR Orthoimagery | Alter the spatial location of roads / intersections in the river corridor |
| USDA NAIP | Alter the spatial location of roads / intersections |

## Minimum Requirements

- Segment description
- Beginning mile point
- Ending mile point
- City FIPS code at left of line segment (still working on this currently)
- City FIPS code at right of line segment (still working on this currently)
- Street name

## Geo-database Modifications

WA-Trans geo-database model was modified and used to make the project more workable for Pend Oreille County, which has never used a GIS or a database.

- A mode order indicator field was added to the Spatial Table to enable faster editing.

- Fields were added to the Segment Geometry Attribute Table. An Error field was created for common errors so that document errors could be identified without immediately having to fix them.

- Geo-database topology rules were created. Topology rules and line directionality were verified. Every segment had to follow these rules.

## Update Management

Each file is updated often. Update Management is the most difficult feature to implement for the following reasons:

- When updates are exported, a unique key field is not maintained. Updates in one file are not carried over in the other. During export from MapInfo to a shape file, MapInfo does not keep the field IDs the same. Neither file contains a unique key or a date field. Also, OIDs are lost in the MapInfo to ESRI conversion.

- The addresses ranges are carried over multiple fields so it's hard to link to the street and block.

- Dirt roads and forest service roads are not carried; too confusing for dispatchers.

A very time-consuming process was developed to deal with all of these problems and manage the updates. An intersect was created with the update file and the WA-Trans geo-database using a 60-ft. limit. Field IDs were exported from the updated file.

## Estimated Road Project Costs to Date

Project costs are estimated using the current encumbered rate. To date, Pend Oreille County has spent approximately $13,770.00.

## Next Steps

Currently, all roads have been spatially referenced for the entire county, including city roads and forest roads, dirt roads, and trails. The next steps are:

- Continue to improve data and addressing with a QA/QC process.

- Check the data against the mileposting data (as another check for accuracy).

- Integrate with WA-Trans and *The National Map.*

- Monitor adoption by the Pend Oreille County agencies.

## Conclusions

- A transportation geo-database like WA-Trans streamlines data integration process.

- Needs of multiple agencies must be met by the data to enable successful adoption.

- A key first step in integrating data from multiple sources is the establishment of unique keys.

Local IDs were used instead of global IDs for unique identifiers. No work was done to integrate CRAB data (such as class, pavement type, pavement width). We didn't have any other address information (such as site address or points) because there is no Parcel file or point address. We're actually building that Parcel data right now. We are only testing integration with the Mobility system and mile posting functionality. Pend Oreille County has never used the milepost data as a Linear Referencing System (LRS).

## III. <u>Review Default Data User Formats Requirements</u>

The *WA-Trans Data User Interface – Default Visual Display of Data* document was created as a result of the last meeting. It provides information for those companies who are working with WA-Trans to create the Data User interface.

**Decision:**   These requirements were accepted at today's meeting as the *default visual display of data* – at least for the first version of the WA-Trans portal.

In the Road Authority document, street data was applied that was not in the CRAB Mobility County data.  Street data came from Pierce and King Counties.  WA-Trans put together a policy that would start at the County level and work with both the main or traditional County GIS Provider <u>and</u> the County Engineer's Office to bring them in the loop.  We want to see if they could work with the cities within their jurisdictions to create a data set that they could give to WA-Trans (if they didn't already have one).  If the cities are not willing to work through the county, then WA-Trans will work directly with the cities.  Our goal is to minimize those interactions because it's easier to work through the counties.

"Output Selection" information is not included in these requirements because that is part of the user's other Portal requirements.  The *Default Data User Formats Requirements* is just the *default view*, displaying what's going to show up.  The Portal requirements were previously reviewed and approved.  That part of the Output requirements is already done and will be implemented in the next few months.

## IV.  <u>Requirements for WA-Trans Change Control Procedures Regarding Data Providers</u>

Michael Leierer led the discussion on evaluation of the *WA-Trans Change Detection High Level Requirements* document.  This document took what was discussed previously about high level requirements.  Now we want to detect the changes and update the WA-Trans database with only the changes.  The idea is to detect the changes prior to putting anything into the database.  Michael asked for everyone's input to these procedures from a Data Provider's point of view.

Regarding the change log, if a Data User is downloading data and needs to know what's changed, they can access a data set-specific log.  This log includes inserts, updates, deletes.  WA-Trans does not delete any data, just "retires" it.

A change log will be grouped to reflect how a user may be updating data within their systems.  Downloaded data will be in a format of their choice.  WA-Trans attributes will be associated with the data.  WA-Trans will need a meeting at some point "to get down to the nitty-gritty" of this, but what we have now is a start.

WA-Trans will develop a process to:

1. Receive the static data set file from the Data Provider.

2. Detect the change based on the data we have.

3. Take this data and start looking at it from a WA-Trans point of view.

4. Know the Data Providers' needs.

# V.   Process for Data User Portal Requirements Regarding Output Adjustments When There Are No Agreement Points

This topic of discussion by Michael Leierer and Andy Norton was cancelled.

# VI.   Accelerated Statewide Implementation Issue

The topic, "*Options for Accelerated Statewide Implementation of WA-Trans*" was presented at the last Steering Committee meeting.  It is the basis for the modified document under review at today's meeting (with the same name).  Feedback was requested to push the need for funding for a Roads-Only solution.  This document is going to be the plan on how we will move forward (probably starting July 2008).  **Option 5** is the major portion of the document that has changed.  Rather than using Census data as the basis for a statewide implementation, we would ask the local Data Providers to share data.  We'd tell them that initially WA-Trans would do all edge-matching across the boundaries.

## Process Overview

WA-Trans will:

1. Use a basic algorithmic method to edge-match and connect all the data.

2. Go back to the Data Providers down the road through an Agreement Point process.

3. Add agreement points and have Data Providers move segments to match those agreement points if they want to engage in that process.

4. Develop Data Sharing agreements later or leverage what the Parcel group is doing.

5. Use Census data where there are gaps.  A translator would be built for each local government and then the Mobility data would be conflated.

By doing edge-matching *only* at this time and not agreements, WA-Trans would save time, doing it as quickly as possible (maybe a year to a year and a half).

*The main issue we're dealing with is the Mobility conflation*.  To meet the expected goals, we'd have to get the local counties to maintain the Mobility conflated data set.  We must work with CRAB to make it a do-able alternative for them.

Ian said that in terms of Mobility, the more rules you have, the less it's really integrated into the business function.  911 and Law Enforcement functions obviously take higher priority, so we must be cognizant of that.  911 Roads Data take more priority in the rural

areas.  Spokane County joins the data on the fly. Right now Mobility is not that GIS friendly.  It may be a strategy where we join it.

WA-Trans will be updated initially as often as possible.  Then it will be updated as it can be.  We can't expect Mobility-based updates — currently required only once a year — to be as frequent as address data.  We either do it ourselves or we work with CRAB to get the counties to drive the process.  Ian said it's a problem when you do something only once a year.  It isn't done very well – you don't remember it and it's not your highest priority.  Many counties don't integrate Mobility and GIS data today.  In some respects, it would really be to CRAB's benefit to work with WA-Trans and have WA-Trans do it.

WA-Trans works well for data integration.  We must be very careful to work with agencies to get their needs met.  Road files are dynamic and there's problems with annexations and data that is maintained by the county.  Sometimes that data isn't really kept up to date that well within Mobility; for example, if someone forgets to note an annexation to the city.  Those road miles still get funded even if they aren't part of the county.  CRAB doesn't have enough resources to supervise those kinds of things.

Tami wants to figure out how to work more closely with our Attorney General's office for the agreement portion of the project.

Andy suggested that Option 5 specify that we will use Census 2008 improved TIGER files.  He asked about partial county gaps, saying that what if the county is giving us a line set that doesn't have any Census 2008 attributes.  We are filling in the gaps with an update of the Census attributes that may or may not be of value to the county.  He says we should specify in the document that we will use Census geometry and addresses and must be clear that we are not adding Census Addressing updates to the rest of the network.

When the Census works with a county to get their roads layered the way they want, the Census gives them a data set with address ranges, but not address points.  Census Bureau used to be heavily dependant on geocoding off the line segments.  That's why they went to the effort to include address ranges in TIGER.  Basically, there's a new data model out there.  What they are doing is taking address databases and creating their private local addresses database file.  That's a tabular file not in GIS, just all known addresses, and working with local governments to update it.  They are interested in a site address rather than a mailing address.  They want to know where the line segment is.  They're really changing their whole methodology on how Census is recorded because GPS is being incorporated into it.

Ian is concerned that over time, TIGER will go downhill because there's really not a business need over the long run for them to maintain that.  What they'll be more interested in is the accuracy of where that road is so that it works with GPS and fits in the right Census track and block.  We should take snapshots where necessary for the short-term Census solution and help the local governments maintain their own data sets.

Andy said there are two different responses by counties we are working with who may be facing Option 5. They do most of their work with site addresses and may not be doing any geocoding by range anymore. They have a Parcel database built for cities within these counties (that is, a point parcel with address points). They won't be concerned about getting Census 2008 updates on their line work. There may be other places where address ranges are actively used. The counties may want those updates from the Census Bureau.

Tami summarized the short-term and long-term goals of WA-Trans:

- Short term goal: Get something out, show usability, get people using it, and get the idea around so WA-Trans can get supported for the long-term goal.

- Long-term goal: Enable data development and data maintenance across the state for a variety of purposes, to be shared by the state as an enterprise asset.

Michelle Blake favors Option 5, saying it will work pretty well. She felt that the WSDOT IT Contracts people may have some thoughts on this. We have set a precedent for it in regard to what is being done with the pilots. They seem to be pretty comfortable with what's being done right now. Allyson also favors Option 5, saying it begins the relationship building that you can take even further without asking too much up front.

Tami asked if there is anyone who does not approve or support Option 5 (with revisions) as a way to move forward with a statewide implementation of WA-Trans. Everyone approved Option 5.

**Decision:** Option 5 (with modifications as described in this section) will be the basis for the first statewide implementation plan.

## Labor Assistance on the Project

Statewide implementation of WA-Trans requires a lot of labor. Michael Leierer has worked through our research department to successfully create an agreement with Central Washington University to assist in this effort. The university has already done some work on the One Road Pilot.

WA-Trans needs to set up something similar on the West side. The DOT has umbrella agreements – not GIS-oriented - to work with Western or the U of W. We can work under those umbrellas to find a GIS lab or group that will assist us and put together Statement of Works very quickly. Or, we can create a new umbrella agreement with another university.

Ian had suggestions based on his experience. He only used interns from Eastern Washington University. He said if people aren't going to use the data long-term, they're not invested in it. They don't use interns for the higher level work. You need people who will use the data long term if you want good data. He said the key to negotiating contracts with universities is to get them to waive their encumbered overhead rates. Convince them to do the work for the good of the community.

| Action Items |
| --- |
| 🖉 Tami will add Pat Whittaker to the Puget Sound PAC. |
| 🖉 Tami will make some modifications to the *Options for Accelerated Statewide Implementation of WA-Trans* document and send it out again. |
| 🖉 Holly Glaser will check with the University of Washington regarding the Seattle Mapping Project as a possible WA-Trans resource to help us.  They've been developing a subsurface map of Seattle. |

## VII. <u>Additional Discussion</u>

One WA-Trans objective is to explicitly store end points in the WA-Trans database. Michael L. feels this is not necessary and said that Chad Brady from Oregon also shares his view.  Michelle Blake said it depends on what the business needs are.  She sees the main function for the end points as being helpful to maintain our data mart.  She added that you use the addresses as a framework to get the 'from' and 'to' logical points, or you use the digitized line work for ESRI data.  Most of the time from the Data Providers, we receive one of two types of products, or both:  their address geocoding or an LRS to report to CRAB.  Or, they use internally for their own maintenance types of work.  When points are brought in, you may conflate them to the address geocoding because generally that is the better data set.  You still maintain the directionality that was provided with the LRS information or the building blocks for the LRS information.

If WA-Trans keeps points for locating events, they must either be based on the addresses or can be created using known measures that come in as events for linear referencing.

PSRC doesn't use an LRS currently.  They have created a network with a lot of beginning and end points, which have meaning to characteristics that change along a roadway facility – that is, the number of lane changes.  They are all extremely important for bringing in information from other networks for assigning values – either an attribute type of transfer or other type of conflation.  Every piece of information associated with an end point helps us with conflation.  Andy pointed out that no notion of topology exists in WA-Trans.

Currently our beginning and end points cannot be used to determine direction because sometimes business rules weren't followed in the digitization process.

With regard to usage of addresses and other mechanisms, Tami asked what the cost, benefit, and value are in doing it. She posed the following questions:

- **Knowing that WA-Trans can't rely on the digitized direction to create beginning and end points, what business needs can be met without those points?**

- **What can be done to create the points not using the digitized direction? Or is there a way we can do it so that it's useful? If we can't do it so that it is useful, then why do it? Is there a way we can do it so that it's useful?**

Tami proposed that topology rules be established using addresses or an LRS. We are not evaluating the data, but must use the best data that is useful.

Michael asked if we process by LRS or addressing. If we do it by addressing, then are we creating completely separate points for the geocoding and the LRS? If so, things could get pretty complicated if the LRS goes the opposite direction of the geocoding.

Tami voiced Michelle's concern, "If we don't have points, we can't create some of our business needs." She added, "If we can't create our business needs, then we may end up undoing the success of our project."

| Action Items |
|---|
| ✎ Michael asked those who have concern or interest to go to our SharePoint site and provide answers to the following key questions: |
| • **Knowing that WA-Trans can't just rely on digitized direction to create beginning and end points that have meaning, what business things *can't* be met if we don't have the points?** |
| • **If we need the points, what are the proposals for creating them, based on knowing that we're going to get unpredictable data where that directionality embedded in the segment may not have the right meaning for us?** |

# VIII.    Close, Next Meeting

The following question was posed:

**Should we continue to meet quarterly or go to three meetings (meeting once every four months)?**

**Decisions:**

- Meet less often.

- Future meetings will take place in February, May, and October, preferably on a Tuesday, Wednesday, or Thursday morning.

**2008 Steering Committee Meeting Dates, Times, and Places:**

- February 14 (Thursday) from 9 a.m. – noon in Spokane with video-conferencing

- May 8 (Thursday) from 9 a.m. – noon in Olympia with video-conferencing

- October 9 (Thursday) from 9 a.m. – noon in Seattle with video-conferencing

**2008 Partner Meeting Dates and Times:**

- April 16 (Wednesday) from 10 a.m. – noon with video-conferencing

- September 10 (Wednesday) from 10 a.m. – noon with video-conferencing.

<u>*WA-Trans Data User Interface – Default Visual Display of Data*</u>

**Background**
The WA-Trans Data User Interface will be able to display data visually. The user will be able to view the data and perform basic "zoom" functions to view the data at different detail within the user interface. When a user initially accesses data in the WA-Trans user interface there will be very little information known, by the application, about what specific data a user would like to see in the visual representation. We also need generic products that can be made readily available to customers for quick download. I think that these are the kinds of products that we would want to make visually accessible to those searching the interface.

**The question is:**
What is the "Default" View of data in the WA-Trans Data User Interface visual display, given conditions in "Set the Stage" below? This default view may also end up being a default download.

**Set the stage:**
1.) Someone is accessing a three county data set of Snohomish, King and Pierce counties.
2.) There is data from each County, WSDOT, Department of Natural Resources (DNR), County Road Administration Board (CRAB), US Forest Service (USFS) and Bureau of Land Management (BLM) in the WA-Trans database for these counties.
3.) This data meets WA-Trans standards for integration and all agreements are in place as to what data is considered the best data from the best source.
4.) At boundaries there are multiple Descriptions, Road Names and Address Ranges for many of the segments.
5.) For state routes there are the local road names and the WSDOT route names for segments.
6.) There are some differences in segment geometry for a few segments and the different geometries are stored in WA-Trans for those segments.

**Solution A**

A user will be required to select from a variety of views. Consider these as WA-Trans **Product Types**. Initially there will only be only two WA-Trans Product Types. These Product Types would display data primarily based on the **Road Authority**, with the **Primary Flag** as support. The Road Authority is defined as the designated infrastructure owner (as legal authority) of that road segment (See Definitions in this document).

**Product Types**

**Product 1 (LRS View):**
A view concentrating on the routes and the associated LRS.  This is a view which can be used for placement of events on the roadway and for planning purposes. For example the LRS view would have:
LRS by road authority (CRAB, WSDOT, DNR, BLM, USFS, etc. LRS values would be reflective of the road authority, provided in one output);
LRS by WSDOT
LRS by County/City (CRAB output)
LRS by DNR
LRS by BLM
LRS by USFS
etc
These can be further broken down by:
With Alleys and Driveways (where available) (makes use of secondary points)
Without Alleys and Driveways …

NOTE: This product type may have to be divided into two different product types: 1.) Single line road geometry and 2.) Dual line road geometry.


**Product 2 (Geocoding View):**
WA-Trans Geocoding view with the address ranges and road names related to those roads. In this case the road name will be the address range road authority. So instead of Hwy 99, the road name displayed in the LRS view, we may have Aurora Ave. as the road name.

This product can be the basis for E911, Census and for other geocoding purposes. This is also solves a problem when the State Patrol is using data.

Both of the above products need to consider the "road authority". For instance for an LRS of a state route let us assume that would be WSDOT. The various descriptions of a specific segment would all be included in WA-Trans, but in the case of the LRS would default to WSDOT. In the case of the Geocoding view of the same set of segments the descriptions of the road would default to the local provider.

**Other Possible Solutions:**

**Solution B**
Display everything. This will include all descriptions. With the different geometries this will also include the display of several segments for the same section of road.

**Pros:**
AP1.)Everything will be available for a user and they can then use functionality in the application to indicate parameter preferences to change the view as they wish.

**Cons:**
AC1.) The visual display will be very busy and possibly not readable, especially at jurisdictional boundaries.
AC2.) The user will need good directions and help to understand what is possible in the application to obtain a view they want.
AC3.) A user may not have the knowledgeable to select appropriate criteria without an extensive understanding and familiarity with the WA-Trans data structures.

**Solution C**
Before any display of data the user will be required to select criteria specifying the data they would like to view. After criteria are selected the data will then be displayed.

Pros:
BP1.) The user will have a view they would like to see.
BP2.) The user will be better able to determine if they need to change their criteria based on the view and criteria already selected.

Cons:

BC1.) The user will need good directions and help to understand what is possible in the application to obtain a view they want.

BC2.) A user may not have the knowledgeable to select appropriate criteria without an extensive understanding and familiarity with the WA-Trans data structures.

## Definitions:

### Product Type:

This is a new term.  The intent term is to label what WA-Trans will provide as a product to a user.  WA-Trans is not providing maps, but is providing data. This data is generally used for two general purposes, 1.) Road Planning and placement of event data using an LRS and 2.) Geocoding.  Both of these sets of data have distinctive differences in the data being used, specifically the descriptions and how that data is applied to the segments.

### Road Authority:

This is a term referring to the Infrastructure Owner, who in many cases will also be the Data Provider/Maintainer. This information is stored in the WA-Trans database and applies to the provider. Infrastructure Owner - An entity or organization that owns the physical infrastructure recorded within the WA-Trans System, and makes decisions about its planning, design, construction or maintenance. The owner could also delegate planning, design, construction or maintenance responsibilities to a third party. In addition, the owner could be the entity that legally owns, and has legal authority and responsibility over, the data that is being submitted to WA-Trans (i.e. the one who has legal authority to make decisions regarding the data that represents the physical infrastructure). In this case, the owner could also be the data steward. An example of an owner might be a larger entity such as a state government agency, county or municipal/city government.

### Primary Flag:

Also stored in the WA-Trans database is a flag on each feature indication if this is the primary record to be used instead of an alternate. For instance this will differentiate between an alternate road name from the same provider.  Making use of the "Primary Flag" fields will help us quickly arrive at a generic, acceptable product.  These flags (formerly known as the "preferred flag") will help us discern the most appropriate geometry, reference point, segment description, segment road address, etc. for the location.  Generally, these will be the items provided by

the road authority, especially the descriptive items (WSDOT for state highway info, counties for addressing and road names, etc.).

<u>For Product Types the "Road Authority" and the Primary Flag will need to be considered together.</u>

**Route (LRS)**
This is a product WA-Trans will be providing as the LRS View. Any line feature, such as a street, highway, or rail line, which has a unique identifier and a measurement system stored with the geometry.

**Route (Network Analysis)**
This is something WA-Trans will **not** be providing as a product, but will store the building blocks necessary for a user to construct in their systems. In network analysis, a route is a path through a network, where a network is an interconnected set of points and lines that represent possible routes from one location to another. For geometric networks, this consists of edge features, junction features, and the connectivity between them. For network datasets, this consists of edge, junction, and turn elements and the connectivity between them. For example, an interconnected set of lines representing a city streets layer is a network.

**WA-Trans Change Detection High Level Requirements**

**Change Detection**
Data providers will submit data to WA-Trans on a periodic basis. Changes between the current data submittal and the previous submittal are necessary prior to any updates of WA-Trans data. This document lists high level requirements for a change detection process.

**Background:**
A primary business need of WA-Trans is user access to current data. The temporality of WA-Trans data is important to many business needs identified by WSDOT and WA-Trans partners. In urban areas of Pierce County data changes 4 percent every 5 months.

**Change Detection:**
Detect any differences in a spatial data file with data in the WA-Trans database. Detect spatial and attribute differences in a spatial data file from a data provider by comparing that data with the data previously submitted to WA-Trans by the same provider.

**Purpose:**

WA-Trans will only update the WA-Trans database data with the detected changes. WA-Trans needs to document the changes made to submitted data over a period of time.

## 1.0 Detect Changes

**1.1 CHANGE DETECTION WILL OCCUR PRIOR TO ANY DATA UPDATES TO THE WA-TRANS DATABASE.**

**1.2 CHANGES DETECTED WILL INCLUDE:**

- **SPATIAL OR GEOGRAPHIC (E.G. RE-SEGMENTATION, SEGMENT ADDITIONS/DELETIONS, RE-ALIGNMENT)**

- **ATTRIBUTE CHANGES AT THE FEATURE LEVEL (E.G. ADDRESS RANGE, NAME OF A STREET)**

- **TABULAR ATTRIBUTE CHANGES (E.G. EVENT CHANGES)**

## 2.0 Update Database

**2.1 WA-TRANS WILL ONLY UPDATE THE WA-TRANS DATABASE DATA WITH THE DETECTED CHANGES.**

**2.2 THE DATE AN UPDATE IS MADE TO A FEATURE AND/OR AN ATTRIBUTE IN WA-TRANS WILL BE RECORDED.**

**2.3 A WA-TRANS UNIQUE ID WILL BE MAINTAINED WHEN UPDATES ARE MADE TO THAT RECORD.**

**2.4 WA-TRANS UNIQUE IDS ARE MANAGED ONLY WHEN ADDING NEW RECORDS.**

2.5 A record/feature will be retired, not removed, when being replaced by newer data. The Unique ID for that record is retired with that record.

2.6 Assigning a "Retired Date" to a record will indicate a retired record.

## 3.0 Change Log

**3.1 A LOG OF CHANGES CAN BE OBTAINED BY A USER DOWNLOADING DATA FROM WA-TRANS. THIS LOG FILE WILL BE REFERRED TO IN THIS DOCUMENT AS A "CHANGE LOG".**

**3.2 A CHANGE LOG WILL CATEGORIZE CHANGES TO INCLUDE:**

1. **INSERTS, SPATIAL,**

2. Inserts, Attribute,

3. Updates Spatial,

4. Updates Attribute,

5. Deletes, Spatial, NOTE: WA-Trans will not delete data in the WA-Trans database. For example a deleted segment found during change detection can trigger WA-Trans to "Retire" that WA-Trans segment, not remove it from the database (See 2.0 Update Database).

6. Deletes, Attribute: NOTE: It is a WA-Trans policy not to delete data in the WA-Trans database. This policy is not clear when referring to just attribute information (for example changes due to accuracy corrections or errors).

7. If data has changed, according to items 5 and 6, there needs to be an association between the old WA-Trans Unique ID and the new WA-Trans Unique ID.

8. **History of changes, for instance multiple providers may apply changes to one segment.**
   - **This requirement needs clarification.**
   - **Has a true history of database changes has been requested?**
   - **Do we record changes categorized by provider instead of a complete history of changes?**

3.3 A Change Log will be grouped to reflect how a user may be updating data within their systems. For example, one way a user works would be to do updates in their systems within a small spatial area. A Change Log listing the changes in alphabetical order would not facilitate this work process. A Change Log could be grouped by a predetermined spatial area.

4.0 DOWNLOADED DATA

Data downloaded by a user will generally reflect the data necessary for a user to use within a format of their choice. The attributes will likely be WA-Trans attributes except in instances where a special OUT transformation has been designed for that user. Even in those cases there will be WA-Trans attributes associated with that data.

WA-Trans will maintain perpetual identifiers and attribution necessary for the WA-Trans database to work effectively. Some of those attributes may be helpful to a user who regularly downloads data, especially when that data is from specific areas.

**4.1 ATTRIBUTES TO BE INCLUDED IN DATA DOWNLOADED BY A USER ARE: (NOTE THIS LIST IS JUST STARTING TO BE FORMULATED. MORE INPUT IS NEEDED)**

- The WA-Trans Unique ID (GUID)

**Options for Accelerated Statewide Implementation of WA-Trans**

## *Background*:

The Washington Transportation Framework Project for GIS (WA-Trans) is a multi-year project to create and maintain a complete, seamless, up-to-date and updateable transportation GIS dataset. The product is flexible: it will not be dependent on any specific GIS software. A solid business case has been presented with a return on investment (ROI) of just under 11%. Several factors stand in the way of receiving complete funding. First, WA-Trans is complex. The deliverables are not easily understood outside of the GIS and IT worlds. The business community needs to see results to completely realize the value and long-range benefits of WA-Trans. Second, with the current implementation strategy of appending local data county by county, a statewide dataset is not expected to be available until 2011. Third, it has a high price tag. The documented optimal business value is dependent on using data from local governments as a major point of the implementation strategy. An accelerated implementation strategy with an intermediate statewide deliverable is considered here as a means to help secure funding and receive partial benefits sooner.

This issue paper evaluates intermediate deliverable options. New U.S. Census Bureau data are scheduled for delivery in 2008. This presents the opportunity to combine these data with WSDOT data and the County Road Administration Board's Mobility data (Mobility) to create an intermediate statewide WA-Trans data set. Other statewide data sets may also be considered. This document examines issues associated with such an intermediate product. The WA-Trans Business Needs Assessment was modified and used in this evaluation.

## Participants

WA-Trans Accelerated Implementation Committee includes: Tami Griffin – WSDOT, WA-Trans Project; Michaellyn Garcia – U.S. Census Bureau; Mac McKay – WA Dept. of Natural Resources; Pat Whittaker – WSDOT; Tim Young – WA Dept. of Fish and Wildlife.

## *Problem Statement*:

The WA-Trans Project is chartered to address the ever growing need for comprehensive statewide transportation GIS data. It will take a significant amount of time to develop WA-Trans from the local level up. This framework project is considering the use of a pre-existing statewide data set such as Census Geographic Data, to be spatially improved statewide by 2008, as the basis for this effort. This document explores the variety of options associated with this accelerated implementation and proposes a recommended solution:

Option 1

- Continue with the original implementation strategy of working with local governments to build a statewide release. Gaps in local data will be filled in with Census Geographic Data.

**Pro**:

- o Maintains the project as currently defined; no shift in focus; no loss of momentum,
- o Assures local governments that their data is a key basis for development of the WA-Trans framework data,
- o Minimizes the number of times users of the data have to alter their systems, manages expectations, and has less impact on related dependencies,
- o Minimizes the rework (as opposed to first using the Census data and then reworking all the counties),
- o Minimizes the requirement of maintaining and supporting the existing product while adding local data,
- o Supports a greater level of temporal accuracy,
- o Meets all business needs except Priority 8, which is called Drainage Systems and Routes from all roadways. This will require data that is currently outside the scope of WA-Trans.

**CON**:

- o Much longer timeline to product delivery,
- o Potential loss of funding and backing,
- o Less to show for all the work done to date,
- o No opportunity to have widespread testing and feedback of the product until all local data is in,
- o Business needs met more slowly,
- o Less integrated dataset for first release.

Option 2

- Complete incorporation of Census Geographic Data with WSDOT and Mobility data based on strategy outlined in statewide task list and make first release. Make subsequent WA-Trans releases as each county is added.

**PRO**:

- o Phased approach provides for intermediary feedback with less initial investment,
- o Significantly earlier first release,
- o Provides for a continuous connected dataset and tests the concepts of the data user portal and downloading,
- o Simplifies elements of conflating the various data because it is all edge matched, etc. Complex agreements are developed on the backend, as local data is added,
- o Provides a dataset to show to help "sell" working out agreements,

o Eventually engages local governments, who may desire to replace Census data with their own,
o Provides a deliverable that meets the highest priority business needs for local and regional users for data outside of the user's jurisdiction,
o Provides something that meets many of the state level and federal level business needs initially,
o Some framework benefits achieved sooner.

## CON:

o Local providers of "newer" data would have to wait longer to see their data in WA-Trans,
o Unrealistic expectations are set about WA-Trans until it has a mix of data sources including local data,
o Initially data will be less temporally accurate.
o Fears of dissatisfaction with potential users,
o May make local governments less likely to participate if they feel something already exists,
o More costly in the long run,
o Potential for significant rework, particularly when conflating Mobility data,
o Lower quality of data (less coverage and accuracy) in some locations.

## Option 3

- Complete Census Geographic Data based on strategy outlined in statewide task list. Then add all counties completed to date and make first release. Make subsequent releases as more counties are added.

## PRO:

o Participating local governments get a more immediate confirmation of their data in WA-Trans,
o Provides a deliverable that meets the highest priority business needs for local and regional users for data outside of the user's jurisdiction,
o Provides a dataset that meets many of the state level and federal level business needs initially,
o Where locally provided data is included a higher level of temporal accuracy will be available,
o Provides users a more immediate example of the benefits of WA-Trans when multiple data providers participate,
o Less rework of Mobility data conflation since some local data is already included.

## CON:

o First release of optimal solution delayed,
o More costly in the long run than option 1,
o Potential for significant rework, particularly when conflating Mobility data in counties where Census data is used,

o Lower quality of data (less coverage and accuracy) in locations where local data is not utilized.

## Option 4

- Create a county and state data set (using Census, Mobility, and WSDOT data) and then add local data.

**Pro**:

o Provides a nice uniform statewide data set in terms of spatial coverage and data type,
o Quickest.

**CON:**

o Will only meet five of the 20 identified high-priority business needs,
o Will not meet the highest priority business needs,
o There will be no ability to maintain the dataset until local data is added (all rests with the state)
o Lower quality of data (less coverage and accuracy) in some locations.

## Option 5

- Approach the counties directly with the need to complete a fast implementation of an interim roads-only product. Ask them to share their data with the following conditions:
    o We will edge match the data across borders,
    o We will return to the data providers later and provide an opportunity to either develop agreement points, or we will assign agreement points during the integration and give the providers the opportunity to change them,
    o We will develop data sharing agreements later (or leverage what is being developed by the Parcel group),
    o We will use Census data where there are gaps,
    o Translators will be developed for each county and for the Census data,
    o Mobility data will be conflated.

Pro:

o Removes the need for duplicate conflation of Mobility data,
o Will be much less costly (see cost section for Mobility data conflation),
o Produces a product that much more completely resembles what WA-Trans will ultimately be,
o Can be started prior to full funding to collect data,
o WA-Trans provides counties with Mobility data conflated to their GIS road centerline for multiple business area uses,
o Translators developed in this effort can be used for WA-Trans long-term.

**Con**:

o May take more time as more local partners are involved,
o Requires counties to agree to maintain mobility data to achieve maximum project benefits,
o Dealing with more disparate data increases the complexity,
o Requires development of a translator for each participating county.

## Option 6

- Do Nothing.

## PRO:

o Saves the costs of the project (from the time the decision is made).

## Con:

o Forces the purchase of data (billing tax payers twice), proprietary data, etc.
o Does not meet any business needs associated with sharing if you purchase,
o If you wait for TIGER you can share but the temporal accuracy will degrade over time,
o Does not meet many of the business needs for emergency management and transportation planning,
o Doesn't leverage the work done on data model and standards and collaborative inter-governmental relationships,
o Forces spending money in other ways to accommodate not having a data set,
o Doesn't support expectations made by grantors, partners and collaborators who have invested hours to assist WA-Trans,
o Contrary to the Washington GIT strategic plan,
o Based on WA-Trans Business Case potential loss of at least 11% on investment.

## *Costs*

At this time it is difficult to estimate costs. Cost factors relevant to this evaluation include:

- It is not free to use Census Data. While the data is publicly available there will be costs associated with building a translator, translating, and conflating WSDOT and Mobility data to WA-Trans.
- It is very likely that a translator will have to be built regardless of option chosen. This is because the Census Data may be the basis for local governments and tribes which don't yet have data.
- Estimating the cost of option 5 is much easier to do than other options because it follows the originally planned approach so closely. Experience gained in the Puget Sound Pilot can be used for all except the Mobility conflation process. Experience gained in the One-Road pilot might be directly usable once it reaches that point for this portion.
- Integration of WSDOT data may only have to be done once. However, conflation of addresses to state routes will have to be completed both on the Census data and any added local data. Additionally, edge-matching and agreement points would have to be done, and then redone.

- The largest extra cost, and a very significant task, is the conflation of the Mobility data. This would be required to meet many of the identified core business needs. This task would have to be done once for Census Data, then again for many counties. Pierce County reported that it took 2 FTE 6 to 8 weeks to complete this activity with the assistance of an additional person who was familiar with the Mobility data. Those two FET were much more familiar with Pierce County data than the WA-Trans Project Staff are.
- Since conflation is such a big part of WA-Trans work the need to evaluate and purchase a robust conflation tool is critical. WA-Trans had originally scheduled this as part of the One-Road Pilot Phase II which is scheduled to begin in 2008. However, such a tool would have to be in-house and ready to go with trained staff before we could begin this conflation effort.
- It is anticipated that meeting several of the business needs earlier, albeit with less temporal accuracy, will assist with the return on investment and may make undertaking these extra costs very worth while.

## *Recommended Solution*

Originally Option 3 was determined to be the recommended solution. However, with urging from the WA-Trans Steering Committee, particularly those representing local government interests Option 5 was developed and seriously considered. It has many benefits over the other options, particularly in the adherence to the WA-Trans concepts which have been validated with pilots and approved by the Steering Committee and other stakeholders. Several assumptions need to be documented and risks mitigated, but if those assumptions hold true Option 5 will get the WA-Trans Project farther along and will minimize the need for rework. This document attempts to provide an objective method of evaluating the options. The Accelerated Implementation Committee of the WA-Trans' Steering Committee recommends Option 5.

## *Next Steps*

There are several steps to be taken in order to be able to implement Option 5:
1. A high level project plan needs to be developed including a schedule, strategic document, risk assessment, cost estimates need to be developed.
2. A white paper and executive summary of the implementation plan and justification need to be developed.
3. A funding strategy needs to be decided and followed
4. Appropriate executive support must be sought and given.
5. A feasibility study needs to be developed along with an investment plan for Department of Information Services.